

## Air Quality Update

# Draft Air Quality Conformity Determination and National Environmental Policy Act (NEPA) Comparative Analysis

**DECEMBER 2016**

### **PURPOSE OF THIS DOCUMENT**

The I-70 East Final Environmental Impact Statement (EIS) was released on January 15, 2016. Since that time, there have been minor adjustments and refinements to the design of the Preferred Alternative. The changes to the design resulted from public and agency comments on the Final EIS and continued evaluation of the Build Alternatives.

This document includes an overview of the project and discussion on the Preferred Alternative and Phase 1 of the Preferred Alternative as discussed in the Final EIS, which is herein referred to as the Central 70 Project. It also includes updated air quality analysis results and draft conformity determination. Reports attached to this document include:

- ☐ Draft Air Quality Conformity Report
- ☐ Air Quality NEPA Comparison Technical Report

### **30 DAY PUBLIC REVIEW PERIOD**

This document, along with the attached reports, are being provided for review and comment from December 16, 2016 to January 14, 2017. A draft conformity determination was not made in the Final EIS, but is included in this document and a final conformity determination will be included in the Record of Decision (ROD) in compliance with 40 CFR §93.

This document is also available in Spanish on the project website, [www.i-70east.com](http://www.i-70east.com), by request through [contactus@i-70east.com](mailto:contactus@i-70east.com), or by calling 303-757-9413.

A printed copy of this document is available for review at the project office (3600 East 46th Avenue, Denver, CO 80216).

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#### **How to submit comments**

Comments will be accepted through email at [contactus@i-70east.com](mailto:contactus@i-70east.com) or by mail to the addresses listed above and must be received by the end of the day (11:59 pm) on January 14, 2017. Mailed comments must be postmarked by January 14, 2017.

## PROJECT DESCRIPTION

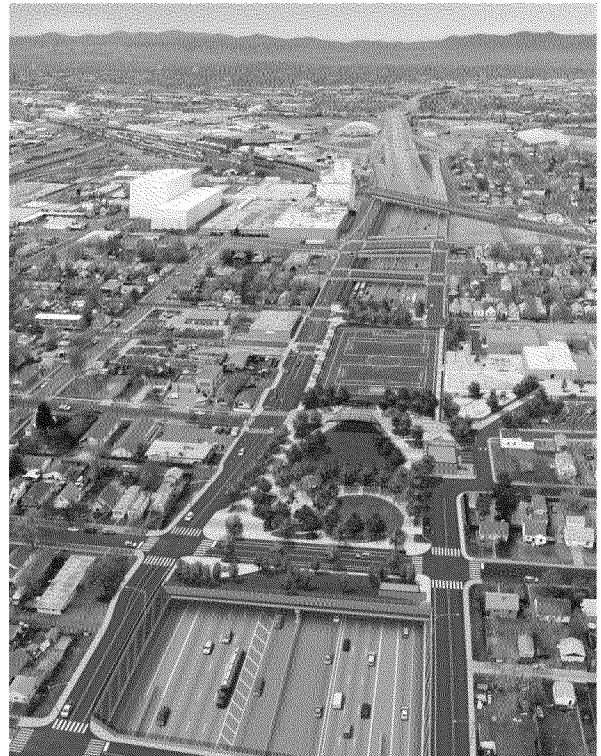
The I-70 East EIS is a joint effort between the Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT). The EIS identifies potential highway improvements along I-70 in the Denver metropolitan area, between I-25 and Tower Road and assesses their potential effects on the human and natural environment.

The project area extends almost 12 miles along I-70 covering portions of the City and County of Denver (Denver), the City of Commerce City (Commerce City), and the City of Aurora (Aurora); and it includes the neighborhoods of Globeville, Elyria and Swansea, Northeast Park Hill, Stapleton, Montbello, Gateway, and a portion of Aurora.

The Preferred Alternative for the I-70 East Project, as identified in the Final EIS, is the Partial Cover Lowered Alternative with Managed Lanes Option, and includes restriping, reconstruction, and/or widening of I-70 from Interstate 25 (I-25) to Tower Road (see Section 2.2 of the Final EIS for more detail).

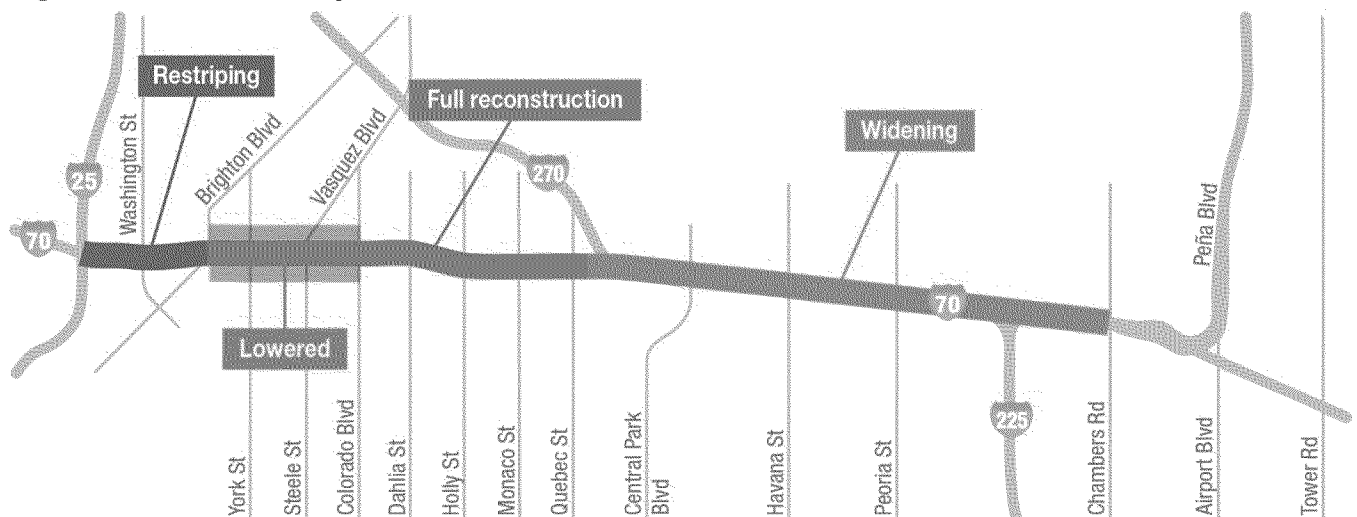
There have been minor adjustments and refinements to the project's design of the Preferred Alternative. The changes to the design resulted from public and agency comments on the Final EIS and continued evaluation of the Build Alternatives. These design refinements include, but are not limited to: revising some intersection configurations, installation of ramp meters at entrance ramps, adding turn lanes on frontage roads and other surface streets, and revising on- and off-ramps and managed lane ingress/egress locations. These changes are included in the analysis completed for the transportation conformity determination.

As outlined in the Final EIS, it is the intent of FHWA and CDOT to implement the Preferred Alternative in its entirety. However, due to current funding limitations, there is only enough money to implement the Central 70 Project.



**Figure 1. Central 70 Project Highway Cover**

**Figure 2. Central 70 Project Overview**



## TRANSPORTATION CONFORMITY

The Clean Air Act Section 176(c) requires that federally supported highway and transit project activities are consistent with state air quality goals, found in the state implementation plan (SIP). The process to ensure this consistency is called Transportation Conformity. Conformity with the SIP means that transportation activities will not cause new violations of the health-based national ambient air quality standards (NAAQS or “standards”), worsen existing violations of the standards, or delay timely attainment of the relevant standard or required interim milestones.

Transportation conformity is required for federal supported transportation projects in areas that have been designated by the U.S. Environmental Protection Agency (EPA) as not meeting one or more of the NAAQS. These areas are called nonattainment areas if they currently do not meet air quality standards or maintenance areas if they have previously violated air quality standards, but currently meet them and have an approved Clean Air Act section 175A maintenance plan.

The I-70 East Project is in a nonattainment area for ozone, and an attainment/maintenance area for coarse particulate matter (PM<sub>10</sub>) and carbon monoxide; therefore, it must comply with transportation conformity requirements for these NAAQS. Project-level conformity also requires an assessment of localized emissions impacts for certain projects in carbon monoxide or PM<sub>10</sub> areas. This localized assessment is called a hotspot analysis.

As described in the following subsections, the regional transportation plan and Transportation Improvement Program (TIP) were found to conform to the carbon monoxide, PM<sub>10</sub>, and ozone SIP. At the project level, the Central 70 Project has been determined to not cause an exceedance of any NAAQS. The proposed project will not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the NAAQS or any required interim emissions reductions or other milestones. This project complies with the transportation conformity regulations in 40 CFR §93 and with the conformity provisions of Section 176(c) of the Clean Air Act.

### Particulate Matter PM<sub>10</sub>

Particulate matter is a complex mixture of very small particles and liquid droplets. PM<sub>10</sub> is a product of vehicle emissions, road sanding, and brake and tire wear. This includes some particles that are large enough to be visible. Particulate matter is not a major component of emissions from gasoline-powered vehicles, which are the predominant source of traffic in this corridor.

### Carbon Monoxide

Carbon monoxide is a colorless, odorless gas emitted directly from vehicle tailpipes as a product of incomplete combustion. Because of this, carbon monoxide tends to concentrate at busy intersections with high vehicle delays and congestion.

### Ozone

Ozone is a pollutant created by the chemical reaction of volatile organic compounds and nitrogen oxides in the presence of sunlight. Ozone is considered a regional issue rather than a localized street or intersection issue, and an individual highway project will typically have little or no effect on regional ozone concentrations.

## Regional Air Quality Conformity (Central 70 Project)

Air quality conformity requires that the Central 70 Project be included in a conforming Fiscally Constrained Regional Transportation Plan (RTP) and a Transportation Improvement Program (TIP). An air quality conformity determination includes regional emissions analysis at the RTP and TIP level demonstrating that regional emissions are within the limits set by the SIP.

The regional air quality conformity analyses are not performed by CDOT or FHWA, nor are they performed for individual CDOT projects. The regional conformity analyses for the RTP and TIP are done by the Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division (APCD) in coordination with the Metropolitan Planning Organization (Denver Regional Council of Governments (DRCOG), in this case) and as part of the formal approval process for the RTP and TIP or an amendment to the RTP and TIP. The development of regional conformity analyses and determinations follow an interagency consultation process (Colorado Air Quality Control Commission Regulation 10). FHWA and the Federal Transit Administration make the conformity determination on the RTP and TIP.

The Central 70 Project is included in the DRCOG 2016-2021 TIP<sup>1</sup> and the 2040 RTP<sup>2</sup>, which were found to conform to the carbon monoxide, PM<sub>10</sub>, and ozone SIP. The DRCOG Board of Directors adopted the 2040 Fiscally Constrained RTP 2015 Cycle 2 Amendment Air Quality Conformity Determination on March 16, 2016. FHWA, after consultation with EPA, issued the Air Quality Conformity Determination for the DRCOG 2040 Fiscally Constrained RTP 2015 Cycle 2 Amendment on May 18, 2016. The design and scope of the Central 70 Project are consistent with that used in the regional emissions analysis for the RTP and TIP.

Additional information on regional air quality conformity can be found in the Draft Air Quality Conformity Report attached to this document.

## Project-Level Air Quality Conformity (Central 70 Project)

Project level conformity requires a demonstration that the Central 70 Project does not contribute to any new local violations, increase the frequency or severity of any existing violations, or delay attainment of the NAAQS or any required interim emission reductions or other milestones.

The air quality analysis procedures for project-level air quality conformity build upon the air quality analysis conducted for the 2014 Supplemental Draft EIS and the 2016 Final EIS. Traffic data from the 2040 DRCOG regional travel demand model were used to conduct the analysis.

The following subsections summarize results for the carbon monoxide and PM<sub>10</sub> hotspot analyses for transportation conformity. Additional details of the analysis are provided in the Draft Air Quality Conformity Report attached to this document. Note that ozone is a regional pollutant and does not have any hotspot analysis requirements.

**Carbon Monoxide Hotspot Analysis.** Hotspot analysis for the Central 70 Project was conducted at the interchange of I-70 and Colorado Boulevard because it is considered to represent the worst case for carbon monoxide concentrations within the study area, based on the analysis of multiple locations in the 2008 Draft EIS.

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<sup>1</sup> ([https://drcog.org/sites/drcog/files/resources/DRCOG%202016-2021%20TIP-Amended%20January%2027%202016\\_0.pdf](https://drcog.org/sites/drcog/files/resources/DRCOG%202016-2021%20TIP-Amended%20January%2027%202016_0.pdf))

<sup>2</sup> ([http://coloradotransportationmatters.com/wp-content/uploads/2015/03/DRCOGFinalRTP\\_02-18-15.pdf](http://coloradotransportationmatters.com/wp-content/uploads/2015/03/DRCOGFinalRTP_02-18-15.pdf))



**Table 1. Carbon Monoxide Hotspot Analysis Results**

Analysis Time Period	Time of Day	Carbon Monoxide Concentration in parts per million (ppm)			NAAQS (standard)
		Background	Modeled	Total Background + Modeled	
1 hour	AM	5.5	1.4	6.9	1-hour standard 35 ppm
	PM		1.9	7.4	
8 hour	AM	3.6	0.9	4.5	8-hour standard 9 ppm
	PM		1.2	4.8	

Estimates of carbon monoxide emissions for Central 70 are well below the NAAQS as shown in Table 1. The results demonstrate that the project will meet the Transportation Conformity requirement for carbon monoxide since Central 70 will not cause or contribute to any new localized violations, nor will it increase the frequency or severity of any existing violations, nor will it delay timely attainment of the carbon monoxide NAAQS.

**PM<sub>10</sub> Hotspot Analysis.** Hotspot analysis for the Central 70 Project was conducted at locations that are expected to have the highest concentrations of PM<sub>10</sub> across the study area. Considerations for locations with the highest concentrations include areas with the highest traffic volumes and congestion, nearby land uses with public access, high numbers of diesel vehicles, and other factors. The following locations were analyzed for PM<sub>10</sub>:

- ☐ Interchange of I-70 and I-25
- ☐ Along I-70 in Swansea
- ☐ Interchange of I-70 and I-225

**Table 2. PM<sub>10</sub> Hotspot Analysis Results**

Location	PM <sub>10</sub> Concentration in micrograms per cubic meter (µg/m <sup>3</sup> )				NAAQS (standard)
	Background	Modeled	Total Background + Modeled	Design Value	
I-70 and I-25	113	41.136	154.136	150	24-hour standard 150 µg/m <sup>3</sup>
I-70 in Swansea		40.948	153.948	150	
I-70 and I-225		32.220	145.220	150	

Estimates of PM<sub>10</sub> emissions for Central 70 are shown in Table 2. The results demonstrate that the project will meet the Transportation Conformity requirement for PM<sub>10</sub> since Central 70 will not cause or contribute to any new localized violations, nor will it increase the frequency or severity of any existing violations, nor will it delay timely attainment of the PM<sub>10</sub> NAAQS.

More information on these hotspot analyses are provided in the attached Air Quality Conformity Report.

## AIR QUALITY NEPA COMPARATIVE ANALYSIS

Air quality continues to be an important resource for the I-70 East Project. This section discusses updates to the NEPA air quality analysis for carbon monoxide and PM<sub>10</sub>. The emissions inventory analysis of total pollutants in the air quality study area remain as presented in the Final EIS.

The air quality analysis procedures for the NEPA comparative analysis build upon the air quality analysis conducted for the 2014 Supplemental Draft EIS and the 2016 Final EIS. Traffic data from the 2040 DRCOG regional travel demand model were used to conduct the analysis.

The following subsections summarize results for the carbon monoxide and PM<sub>10</sub> NEPA comparative analysis for the alternatives evaluated in the Final EIS. Additional details of the analysis are provided in the Updates to Air Quality Technical Report attached to this document.

**Carbon Monoxide.** NEPA comparative analysis was conducted at the interchange of I-70 and Colorado Boulevard because it is considered to represent the worst case for carbon monoxide emissions within the study area. Results are provided in Table 3 below.

**Table 3. Carbon Monoxide NEPA Comparative Analysis Results**

Analysis Time Period	Time of Day	Carbon Monoxide Concentration in parts per million (ppm)		
		Background	Modeled	Total Background + Modeled
Preferred Alternative (Partial Cover Lowered Alternative with Managed Lanes)				
1 hour	AM	5.5	1.4	6.9
	PM		1.9	7.4
8 hour	AM	3.6	0.9	4.5
	PM		1.2	4.8
Central 70 Project (Phase 1 of the Preferred Alternative)				
1 hour	AM	5.5	1.4	6.9
	PM		1.9	7.4
8 hour	AM	3.6	0.9	4.5
	PM		1.3	4.9

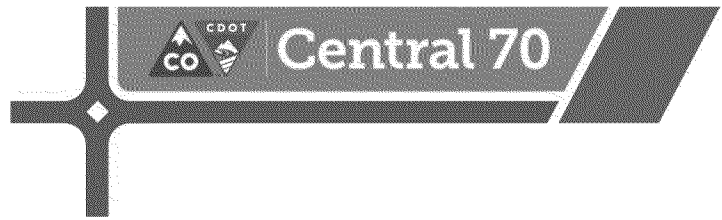
**PM<sub>10</sub>.** NEPA comparative analysis was conducted at locations that are expected to have the highest concentrations of PM<sub>10</sub> across the study area. Considerations for locations with the highest concentrations include areas with the highest traffic volumes and congestion, nearby land uses with public access, high numbers of diesel vehicles, and other factors. The locations analyzed for NEPA comparative analysis for PM<sub>10</sub> are the interchange of I-70 and I-25 and the interchange of I-70 and I-225. Results are provided in Table 4.

**Table 4. PM<sub>10</sub> NEPA Comparative Analysis Results**

Location	PM <sub>10</sub> Concentration in micrograms per cubic meter (µg/m³)			
	Background	Modeled	Total Background + Modeled	Design Value
No-Action Alternative				
I-70 and I-25	113	40.396	153.396	150
I-70 and I-225		28.732	141.732	140
Preferred Alternative (Partial Cover Lowered Alternative with Managed Lanes)				
I-70 and I-25	113	41.196	154.196	150
I-70 and I-225		32.285	145.285	150
Central 70 Project (Phase 1 of the Preferred Alternative)				
I-70 and I-25	113	41.136	154.136	150
I-70 and I-225		32.220	145.220	150
Revised Viaduct Alternative, General Purpose Lanes				
I-70 and I-25	113	41.554	154.554	150
I-70 and I-225		30.564	143.564	140
Revised Viaduct Alternative, Managed Lanes				
I-70 and I-25	113	41.073	154.073	150
I-70 and I-225		32.968	144.968	140
Partial Cover Lowered Alternative, General Purpose Lanes				
I-70 and I-25	113	41.703	154.703	150
I-70 and I-225		31.085	144.085	140

More information on these NEPA analyses are provided in the attached document, Updates to Air Quality Technical Report.





**I-70 East**

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**Draft Air Quality Conformity  
Technical Report**

**December 2016**



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# TABLE OF CONTENTS

Chapter	Page
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1	PURPOSE OF THIS REPORT .....	1
2	PROJECT DESCRIPTION .....	1
3	TRANSPORTATION CONFORMITY .....	2
4	REGIONAL TRANSPORTATION PLAN .....	4
5	DETERMINATION OF REGIONAL AND PROJECT LEVEL CONFORMITY .....	4
5.1	Regional Conformity .....	4
6	HOTSPOT METHODOLOGY AND INTERAGENCY CONSULTATION .....	5
6.1	Carbon Monoxide Hotspot Analysis Methodology .....	6
6.2	PM <sub>10</sub> Hotspot Analysis Methodology .....	8
7	DRAFT PROJECT-LEVEL CONFORMITY ANALYSIS .....	10
8	CONCLUSIONS .....	13
9	REFERENCES .....	14

## Tables

Table 1	Carbon Monoxide Concentrations .....	10
Table 2	PM <sub>10</sub> Concentrations .....	10

## Figures

Figure 1	Central 70 Project Overview .....	2
Figure 2	Diagram of PM <sub>10</sub> I-25 Model Split .....	9
Figure 3	Maximum Concentration Receptor Location for PM <sub>10</sub> at I-25/I-70 .....	11
Figure 4	Maximum Concentration Receptor Locations for PM <sub>10</sub> at Swansea/I-70 .....	12
Figure 5	Maximum Concentration Receptor Locations for PM <sub>10</sub> at I-70/I-225 .....	12

## LIST OF ACRONYMS

AM	Morning
APCD	Air Pollution Control Division
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
DRCOG	Denver Regional Council of Governments
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GHG	Greenhouse gas
I-25	Interstate 25
I-70	Interstate 70
I-225	Interstate 225
I-270	Interstate 270
LOS	Level of service
MOVES2010b	Motor Vehicle Emission Simulator version 2010b
MSAT	Mobile source air toxic
NAAQS	National ambient air quality standards
NEPA	National Environmental Policy Act
PM	Particulate matter
PM <sub>10</sub>	Particulate matter of 10 microns or less in diameter
ppm	Parts per million
ROD	Record of Decision
RTP	Regional Transportation Plan
SIP	State Implementation Plan
STIP	Statewide Transportation Improvement Plan
TIP	Transportation Improvement Program
VMT	Vehicle miles traveled
µg/m <sup>3</sup>	Micrograms per cubic meter

## 1 PURPOSE OF THIS REPORT

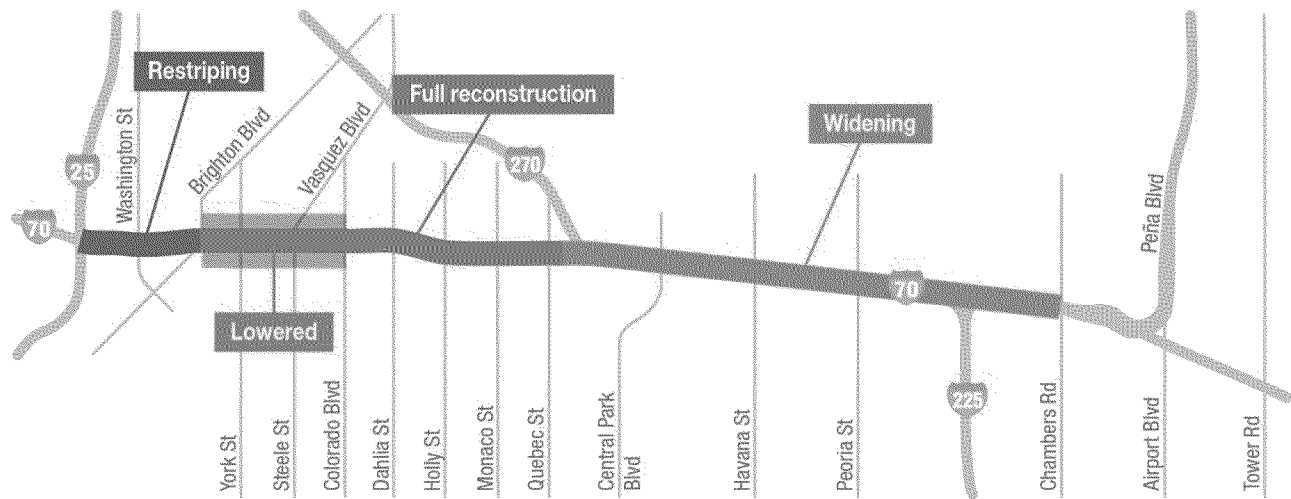
This document describes the methods used to show that the Interstate 70 (I-70) East Project will meet the requirements of the Clean Air Act, and will not cause violations of air quality standards in the Denver region when the project is completed and being used by the traveling public. The Clean Air Act, Section 176(c), requires that federally supported highway and transit projects are consistent with state air quality goals, found in the State Implementation Plan (SIP). The process to ensure this consistency is called Transportation Conformity. Conformity to the SIP means that transportation activities will not cause new violations of the national ambient air quality standards (NAAQS or “standards”), worsen existing violations of the standard, or delay timely attainment of the relevant standard or required interim milestones. Transportation conformity is required for federally supported transportation projects in areas that have been designated by the U.S. Environmental Protection Agency (EPA) as not meeting one or more of the transportation-related NAAQS.

## 2 PROJECT DESCRIPTION

As outlined in the Final EIS, it is the intent of the Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT) to implement the Preferred Alternative of the I-70 East Project in its entirety. However, due to current funding limitations, there is only enough money to implement Phase 1 of the Preferred Alternative, which is herein referred to as the Central 70 Project. The Record of Decision (ROD) for the Central 70 Project allows it to move forward into construction. The Central 70 Project incorporates portions of the identified Preferred Alternative, the Partial Cover Lowered Alternative with Managed Lanes Option. It includes all construction and mitigation commitments included in the Preferred Alternative from Brighton Boulevard to Chambers Road. It also includes several minor design changes that occurred in consideration of comments received on the FEIS.

In general, the Central 70 Project includes the complete reconstruction of I-70 from Brighton Boulevard to Interstate 270 (I-270) with pavement width for the addition of two lanes in each direction as seen in Figure 1. Only one lane will be open for use until traffic demand is met to open the second lane. It also includes widening the remaining stretch from I-270 to Chambers Road to accommodate one additional lane in each direction and restriping the roadway from Interstate 25 (I-25) to Brighton Boulevard.

1 **Figure 1 Central 70 Project Overview**



### 3 TRANSPORTATION CONFORMITY

In all areas that have been designated as nonattainment or attainment/maintenance for any of the transportation-related criteria pollutants, state governments are required to develop a SIP, which explains how the state will comply with the requirements of the Clean Air Act. The Clean Air Act also requires that metropolitan transportation plans, metropolitan Transportation Improvement Programs (TIPs), and projects that are developed, funded, or approved by FHWA and the Federal Transit Administration must demonstrate that such activities “conform” to the SIP. Transportation conformity requirements apply to any transportation-related criteria pollutants for which the project area has been designated a nonattainment or attainment/maintenance area. For the I-70 East Project, the criteria pollutants of concern are carbon monoxide, coarse particulate matter of less than 10 microns in size (PM<sub>10</sub>), and ozone.

As noted above, under Section 176(c) of the Clean Air Act, a transportation project is said to conform to the provisions and purposes of the SIP if the project, both alone and in combination with other planned projects, does not:

- ☐ Cause or contribute to new air quality violations of the NAAQS,
- ☐ Worsen existing violations of the NAAQS, or
- ☐ Delay timely attainment of the NAAQS or required interim milestones.

Conformity applies at both the regional level for metropolitan plans and TIPs and at the project level for transportation projects in air quality nonattainment and attainment/maintenance areas. The regional conformity analyses are not performed by CDOT, nor are they performed for individual CDOT projects. The regional air quality analyses are performed by the Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division (APCD), in coordination with the Denver Regional Council of Governments (DRCOG) for the formal approval process of the Regional Transportation Plan (RTP) and TIP.

Additionally, if there are significant changes to the project's design concept and scope during the planning process, the regional emission analysis will need to be revisited and a conformity determination completed on the RTP and TIP before the project can complete the National Environmental Policy Act (NEPA) process (40 Code of Federal Regulations (CFR) §93.107).

For certain projects in carbon monoxide and PM<sub>10</sub> areas, a hotspot analysis is required as part of the project level conformity determination. A hotspot analysis for the I-70 East Project is required for carbon monoxide because the Denver region is an attainment/maintenance area and because it meets the second of the project screening criteria, cited in 40 CFR §93.123 (a), and listed below:

- ☐ (i) Projects in or affecting locations, areas, or categories of sites which are identified in the applicable implementation plan as sites of violation or possible violation;
- ☐ (ii) Projects affecting intersections that are at Level-of-Service D, E, or F, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes related to the project;
- ☐ (iii) Projects affecting one or more of the top three intersections in the nonattainment or maintenance area with highest traffic volumes, as identified in the applicable implementation plan; and
- ☐ (iv) Projects affecting one or more of the top three intersections in the nonattainment or maintenance area with the worst level of service, as identified in the applicable implementation plan.

A PM<sub>10</sub> hotspot analysis is required for projects of local air quality concern in PM<sub>10</sub> nonattainment and attainment/maintenance areas per 40 CFR §93.123(b). EPA regulations (40 CFR §93.123(b)) state that a project will be determined to be of local air quality concern if it meets any of five evaluation criteria. Two of the five criteria are related to transit projects and are not applicable to the I-70 East Project. The remaining three criteria are all potentially applicable:

- ☐ New highway projects that have a significant number of diesel vehicles, and expanded highway projects that have a significant increase in the number of diesel vehicles.

- ☐ Projects affecting intersections that are at level of service (LOS) D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project.
- ☐ Projects in or affecting locations in areas, or categories of sites that are identified in the PM<sub>2.5</sub> or PM<sub>10</sub> applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The I-70 East Project was determined to be a project of local air quality concern through the Interagency Consultation process for the following reasons: it is an expanded highway project that has a significant number of diesel vehicles and the project affects intersections that are at LOS D, E, or F with a significant number of diesel vehicles. Interagency consultation confirmed the need for a hotspot analysis to be completed for PM<sub>10</sub>.

## 4 REGIONAL TRANSPORTATION PLAN

As specified in 40 CFR §93.115, a project must be included in a conforming RTP and TIP. Since the release of the Final EIS, DRCOG adopted an amendment to the 2040 Fiscally Constrained RTP (March 16, 2016), which includes the Central 70 Project. This extends the hotspot analysis to the DRCOG planning horizon year of 2040, as required by the EPA in 40 CFR §93.116(a), to demonstrate that during the time frame of the transportation plan no new local violations will be created and the severity or number of existing violations will not be increased as a result of the project. The portions of the Preferred Alternative included in the Central 70 Project, as described in Section 1 above, will be implemented between now and 2021 are included in the conforming TIP.

In addition to extending the planning horizon, the 2040 Fiscally Constrained RTP includes transportation volumes modeled by DRCOG using the Focus travel demand model.

## 5 DETERMINATION OF REGIONAL AND PROJECT LEVEL CONFORMITY

The Central 70 Project is within the Denver maintenance/attainment areas for PM<sub>10</sub> and carbon monoxide and within the marginal nonattainment area for ozone. The Transportation Conformity Rule, 40 CFR §93.104(d), requires that the I-70 East Project conform prior to being approved or funded. Part of the conformity determination requires the project to be included in the regional emissions analysis for the conforming RTP and TIP. The project-level conformity determination demonstrates that an individual project does not contribute to any new local violations, increase the frequency or the severity of existing violations, or delay timely attainment of the NAAQS or any required interim emissions reductions or other milestones.

### 5.1 Regional Conformity

The development of regional conformity analyses and determinations follow an Interagency Consultation process (Colorado Air Quality Control Commission Regulation 10). As described below, the project meets conformity requirements.



The Central 70 Project is incorporated into the following RTP:

- ☐ 2015 Cycle 2 Amendments to the 2040 Fiscally Constrained RTP was adopted by the DRCOG board on March 16, 2016. FHWA, after consultation with EPA, issued the Air Quality Conformity Determination for the DRCOG 2040 Fiscally Constrained RTP 2015 Cycle 2 Amendment on May 18, 2016.

The portions of the Central 70 Project that will be implemented between now and 2021 are included in the DRCOG 2016–2021 TIP amended March 2016, as follows:

- ☐ Additional capacity between Brighton Boulevard and I-270, with the addition of one managed lane in each direction
- ☐ Additional capacity between I-270 and Chambers Road
- ☐ Additional ramps at the Colorado Boulevard and I-70 interchange

The Central 70 Project also is included in the Fiscal Year 2017–2020 Statewide Transportation Improvement Program, adopted May 2016.

DRCOG conformity determinations were made for the RTP and TIPs as noted below:

- ☐ 2015 Cycle 2 Amendments, CO and PM<sub>10</sub> Conformity Determination, for the DRCOG 2040 Fiscally Constrained RTP and the Amended 2016–2021 TIP, as adopted by the DRCOG Board on March 16, 2016, is available at the following website:  
[https://drcog.org/sites/drcog/files/resources/DRCOG%202016-2021%20TIP-%20Amended%20September%2021%202016\\_0.pdf](https://drcog.org/sites/drcog/files/resources/DRCOG%202016-2021%20TIP-%20Amended%20September%2021%202016_0.pdf)
- ☐ 2015 Cycle 2 Amendments, Denver Southern Subarea 8-Hour Ozone Conformity Determination, for the DRCOG 2040 Fiscally Constrained RTP and the Amended 2016–2021 TIP and the Southern Subarea Portion of the Upper Front Range 2040 RTP and the 2016–2019 Statewide Transportation Improvement Program for the Upper Front Range Transportation Planning Region, as adopted by the DRCOG Board on March 16, 2016, is available at the following website:  
<https://drcog.org/sites/drcog/files/resources/FINAL%202015%20Cycle%202%20Denver%20Southern%20Subarea%208-Hour%20Ozone%20Conformity%20Determination.pdf>

DRCOG's analysis shows the emission results for determination of regional conformity remain significantly under each of the individual pollutant budgets with the Central 70 Project included in the RTP.

## 6 HOTSPOT METHODOLOGY AND INTERAGENCY CONSULTATION

The transportation conformity rule requires that the year(s) of peak emissions within the time frame of the RTP be considered in the hotspot analysis. Because the project is included in the DRCOG 2040 RTP, the hotspot analyses have been updated to reflect 2040 as the timeframe of the plan and also as the year of peak emissions, with the highest traffic volumes and PM<sub>10</sub> emissions, as shown in the RTP, and the highest potential background concentrations for PM<sub>10</sub>. In November 2015, the EPA published revised guidance that describes how to complete quantitative hotspot analysis for certain highway and transit projects in PM<sub>2.5</sub>.

and PM<sub>10</sub> nonattainment and maintenance areas and the transportation conformity requirements which was followed for the Central 70 conformity analysis.

The approach to the air quality analysis has been documented throughout the I-70 East Project in the Air Quality Analysis Protocol and its updates. The procedures in this document have been reviewed through the Interagency Consultation process for each step in the NEPA process. The Interagency Consultation process included the EPA, CDPHE-APCD, CDOT, and FHWA. These agencies also provided direction on the transportation conformity determination.

Although the trip-based Compass travel demand model used for the Final EIS continues to be an approved resource for quantifying traffic in the region the interagency partners determined that traffic volumes used for the 2040 hotspot analysis should be developed from the most recent Focus travel demand model updated for the 2040 RTP.

## **6.1 Carbon Monoxide Hotspot Analysis Methodology**

The carbon monoxide hotspot analysis methodology is consistent with processes documented in the Final EIS, with the following modifications: the carbon monoxide hotspot analyses are based on 2040 data from the DRCOG Focus model.

During Interagency Consultation, the EPA Administrator for Region 8 approved a process decision to streamline the comparative intersection analysis of numerous years by creating a worst-case scenario using the worst-case emissions factors combined with the worst traffic volume. As agreed to by the EPA Administrator and reported in the Final EIS, the screening process for the carbon monoxide hotspot analysis for the I-70 East Project used the highest vehicle miles traveled (VMT) activity in the year 2035, combined with the Motor Vehicle Emissions Simulator (MOVES) emissions factors in the opening year 2010 (EPA, 2013).

For the update of the carbon monoxide analysis for conformity, the approach was maintained the same as the Final EIS. The highest emission factors (2022) were combined with the highest traffic volumes (2040). Because the improvements will not be built for several more years, 2022 was judged to be more representative of opening-day conditions than 2010. The method produces overstated carbon monoxide concentrations, but ensures the maximum potential carbon monoxide concentrations are considered. Other modeling parameters such as meteorology were consistent with those used during the Final EIS carbon monoxide hotspot analysis.

## **Model selection**

An emissions model and an air quality dispersion model were selected through the Interagency Consultation process. As with the Final EIS, the analysis continued to use EPA's MOVES2010b model at the project level to estimate emissions for each roadway link in the carbon monoxide hotspot study area because the update to the analysis started in May 2016 during the MOVES2014 grace period.. EPA's CAL3QHC software continued to be used to conduct carbon monoxide dispersion modeling. CAL3QHC is the recommended model for use in estimating carbon monoxide emissions.

## Model year

Traffic data from the 2040 DRCOG Focus model was used to address the conformity requirement for the hotspot analysis to consider the year of peak emissions over the time frame of the transportation plan. MOVES2010b emissions rates from 2022 were used.

The worst traffic year is considered to be 2040. As discussed above, this update is consistent with regional air quality modeling and with the desire to represent the worst-case scenario. CDOT agreed with APCD's request to use 2022 for the updated modeling to represent the opening year. The project analysis is required to account for the year of peak emissions over the time frame of the transportation plan, and 2010 is not within that time frame or that of the project.

## Locations to model

As with the Final EIS, the Colorado Boulevard interchange was identified as the location to represent the worst traffic conditions on the corridor for the conformity analysis. For the Final EIS, a sensitivity analysis was performed using the DynusT traffic model to validate the choice of the I-70 interchange at Colorado Boulevard as the worst-case location for the carbon monoxide hotspot analysis. The analysis found that the I-70 interchanges at Quebec Street and Colorado Boulevard are the two worst interchanges in 2035, with the model predicting slightly higher carbon monoxide emissions at the Quebec Street interchange due to higher traffic volumes and longer delays.

While updating traffic data to the most recent 2040 Focus model, the traffic volumes at Colorado Boulevard and Quebec Street were reviewed again. The predicted 2040 traffic levels of service at Colorado Boulevard in the morning (AM) and afternoon (PM) peak hours are LOS D and LOS D, respectively. The same relatively small differences in traffic and congestion between the two intersections exist in the new 2040 model as was reported in the Final EIS. The predicted results from modeling carbon monoxide emissions would vary only by 0.2 parts per million (ppm) to 0.4 ppm, as disclosed in the Final EIS Air Quality Technical Report. Given the minimal differences, continued use of the I-70 and Colorado Boulevard interchange as the location for the carbon monoxide hotspot analysis is appropriate.

## Emission factors

Carbon monoxide emission factors were developed using MOVES2010b for 2022, to address the conformity requirement for the hotspot analysis to consider the year of peak emissions over the life of the RTP. Carbon monoxide emission factors were developed for various vehicle types, road slopes, road types, and vehicle speeds. From these data, composite carbon emission factors were developed for each road segment by referencing emission factors for DRCOG traffic links, depending on the traffic and geographic characteristics of those links.

## Background concentrations

To estimate maximum carbon monoxide concentrations, modeled results were added to background values provided by APCD. Values for background concentrations in the year 2040 related to measured concentrations in the NAAQS are as follows:

- ☐ One-hour background concentration = 5.5 ppm
- ☐ Eight-hour background concentration = 3.6 ppm

## 6.2 PM<sub>10</sub> Hotspot Analysis Methodology

Methodology for conducting the PM<sub>10</sub> hotspot analysis, as well as for calculating a design value, are consistent with processes documented in the Final EIS. EPA's particulate matter hotspot guidance (EPA-420-B-13-053) for calculating design values was applied to the PM<sub>10</sub> hotspot analysis; and the design values estimated through the comparative analysis were compared against the NAAQS for PM<sub>10</sub>.

### Model selection

Consistent with the FEIS, EPA's MOVES2010b model continued to be used at the project scale to estimate emissions for each roadway link. As with the Final EIS, the analysis continued to use EPA's MOVES2010b model for use at the project scale level to estimate emissions for each roadway link in the carbon monoxide hotspot study area because the update to the analysis started in May 2016 during the MOVES2014 grace period. EPA's AERMOD model (version 15181) was selected through Interagency Consultation for the air dispersion analysis and estimation of pollutant concentrations at receptors in the local near-road land areas. AERMOD can model lowered sections of roadway, as in the Central 70 Project, as well as the outflow from the proposed covered portion of I-70.

### Model year

As discussed previously, for consistency with regional air quality modeling and based on assumptions developed from regional PM<sub>10</sub> modeling results, 2040 has been identified as the year of peak emissions for PM<sub>10</sub>, and is, therefore, the most indicative of the worst air quality conditions for analysis.

### Locations to model

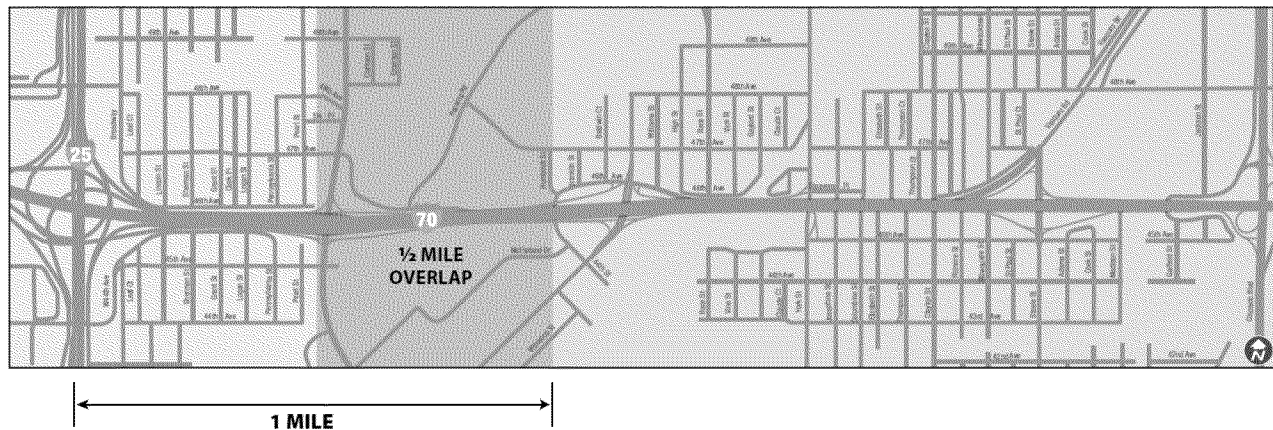
Based on the locations of maximum receptors and results presented in the Final EIS, the I-25/I-70 interchange area and the Interstate 225 (I-225)/I-70 interchange have been maintained as the primary focus areas for the air quality analysis. To better manage the workflow and reduce execution times of individual AERMOD runs, the project was divided into three areas, as shown in Figure 2 below:

- 1) I-25 Interchange (yellow/green)—west of the I-25 interchange to just west of Brighton Boulevard
- 2) Swansea Area (green/blue)—from Washington Street to the Vasquez Boulevard interchange
- 3) I-225 Interchange—just east of Chambers Road to just west of Tower Road

Even though the west portion of the I-70 East Project was split into two sections for managing modeling workflow and reducing AERMOD run times, there is a half-mile overlap (green area) of the vehicle emission links considered in both the I-25 Interchange (yellow area) and Swansea Area model runs (blue area). Additionally, the I-225 and I-25 interchanges were the original two locations identified during Interagency Consultation for the Final EIS as the hotspot locations to be modeled for PM<sub>10</sub> conformity. The Swansea area was added to the I-25 area to address air quality concerns raised by the Elyria-Swansea community located east of Brighton Boulevard.

This Swansea area is located east of Brighton Boulevard about one mile from the I-25 interchange with no meaningful concentration contributions from the interchange. Previous modeling indicated that the highest concentrations were predicted along the I-25 corridor and along I-70 at the I-225 interchange.

## 1 **Figure 2 Diagram of PM<sub>10</sub> I-25 Model Split**



2  
3 For the analysis, traffic links were included in the air quality model if there was a design or operational  
4 change to the roadway network or if the project had a negative impact on roadway operations. This  
5 included local roads and intersection operations where there are designs that add capacity. Using this  
6 approach, the number of links increased to include additional traffic links on Vasquez Boulevard, Brighton  
7 Boulevard, and York Street, as well as at Steele Street and 45th Avenue.

## 8 **Emission factors**

9 As in the FEIS, emission factors for PM<sub>10</sub> were developed using MOVES2010b . As with the Final EIS, the  
10 analysis continued to use EPA's MOVES2010b model at the project level to estimate emissions for each  
11 roadway link in the carbon monoxide hotspot study area because the update to the analysis started in May  
12 2016 during the MOVES2014 grace period. PM<sub>10</sub> emission factors were developed for various vehicle types,  
13 road slopes, road types, and vehicle speeds. From these data, composite particulate emission factors were  
14 developed for each road segment by referencing emission factors for DRCOG traffic links, depending on the  
15 traffic and geographic characteristics of those links.

16 Road dust from mobile sources is the major contributor of particulate emissions from the project. MOVES  
17 does not calculate particulate matter emissions from road dust, however. To estimate road dust and  
18 sanding emissions for this analysis, emissions factors from the most recent PM<sub>10</sub> maintenance conformity  
19 modeling were used, accounting for dust mitigation controls committed to by CDOT in consultation with  
20 APCD.

## 21 **Background concentrations**

22 Updated EPA guidance (a June 20, 2016 email from EPA Region 8, included in correspondence with EPA,  
23 Appendix J) requires use of the third highest PM<sub>10</sub> value over a three-year period, excluding exceptional  
24 events, to represent background concentrations. For the conformity determination, the background  
25 concentrations were estimated using 2012 to 2014 data, resulting in a background PM<sub>10</sub> value of 113  
26 micrograms per cubic meter (µg/m<sup>3</sup>).

## 27 **Receptor grid**

28 The methodology to determine the receptor placement remained the same as described in the Final EIS.

## 7 DRAFT PROJECT-LEVEL CONFORMITY ANALYSIS

Design values are the metric used to compare the values produced by air quality modeling with the NAAQS. Modeling estimates of carbon monoxide emissions for the Central 70 Project are well below the NAAQS for the hotspots modeled for conformity purposes, as described in Table 1. The results demonstrate that the project will meet the transportation conformity requirements because the Central 70 Project will not cause or contribute to any new localized carbon monoxide violations, nor will it increase the frequency or severity of any existing ozone violations, nor will it delay timely attainment of the carbon monoxide NAAQS.

**Table 1 Carbon Monoxide Concentrations**

Analysis Time Period	Time of Day	Carbon Monoxide Concentration in parts per million (ppm)			NAAQS (standard)
		Background*	Modeled	Total Background + Modeled	
1 hour	AM	5.5	1.4	6.9	1-hour standard 35 ppm
	PM		1.9	7.4	
8 hour	AM	3.6	0.9	4.5	8-hour standard 9 ppm
	PM		1.2	4.8	

\*Background concentrations provided by APCD.

EPA's PM guidance (EPA-420-B-15-084) for calculating design values was applied to the PM<sub>10</sub> hotspot analysis. The contributions from the project, nearby sources, and background concentrations from other sources are combined to estimate 2040 emission concentrations (i.e., design values) at receptor locations. Maximum receptor locations are shown in Figure 3, Figure 4, and Figure 5.

Design values for the Central 70 Project are 150 µg/m<sup>3</sup> for the PM<sub>10</sub> hotspots modeled for conformity purposes, as described in Table 2. The results demonstrate that the project will meet the Transportation Conformity requirements because the Central 70 Project will not cause or contribute to any new localized PM<sub>10</sub> violations, or increase the frequency or severity of any existing ozone violations, or delay timely attainment of the PM<sub>10</sub> NAAQS.

**Table 2 PM<sub>10</sub> Concentrations**

Location	PM <sub>10</sub> Concentration in micrograms per cubic meter (µg/m <sup>3</sup> )				NAAQS (standard)
	Background	Modeled	Total Background + Modeled	Design Value	
I-70 and I-25	113	41.136	154.136	150	24-hour standard 150 µg/m <sup>3</sup>
I-70 in Swansea		40.948	153.948	150	
I-70 and I-225		32.220	145.220	150	

To develop these estimates, the 24-hour PM<sub>10</sub> design value is rounded per guidance to the nearest 10 µg/m<sup>3</sup>. For example, 155.000 rounds to 160, and 154.999 rounds to 150. The Central 70 Project is located in the marginal nonattainment area for the Denver-North Front Range Area for the 2008 ozone standard. Since ozone is a regional pollutant, there is no requirement to analyze potential impacts through hotspot modeling and no possibility of localized violations of ozone to occur at the project level.



1 **Figure 3 Maximum Concentration Receptor Location for  $PM_{10}$  at I-25/I-70**



● Receptor

● Maximum receptor

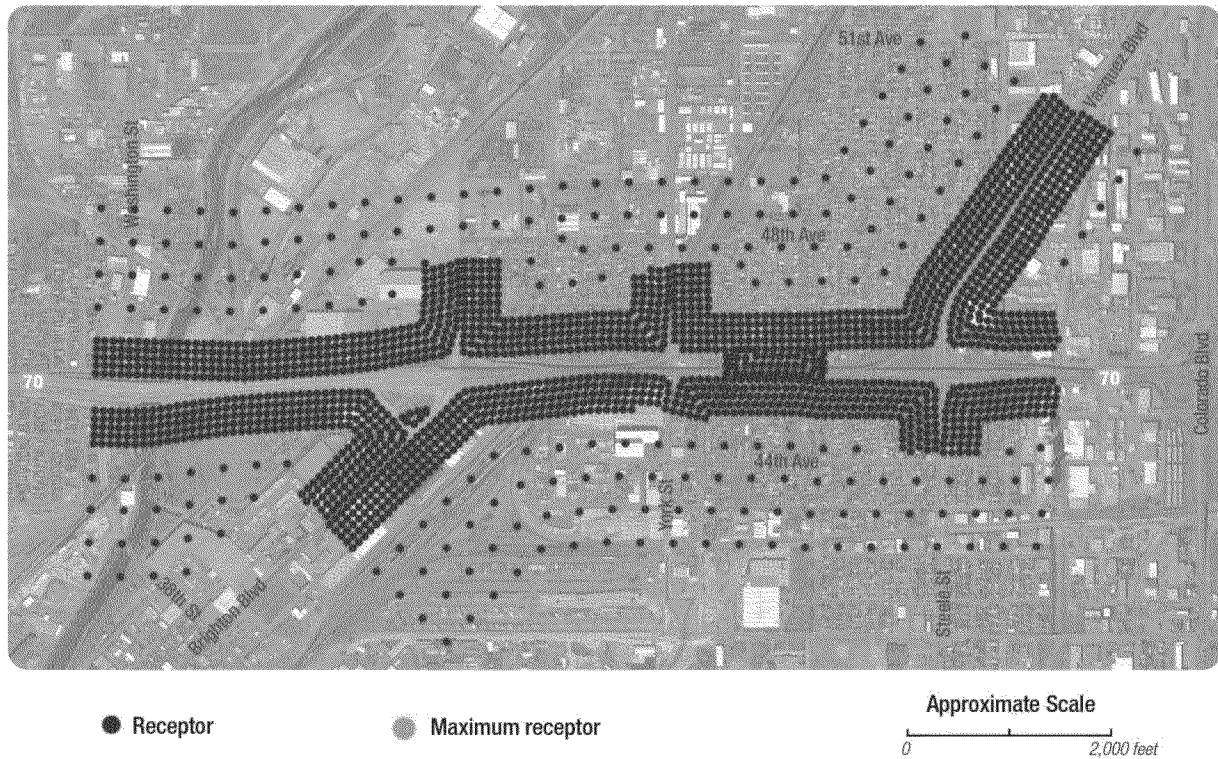
Approximate Scale

0 1,000 feet

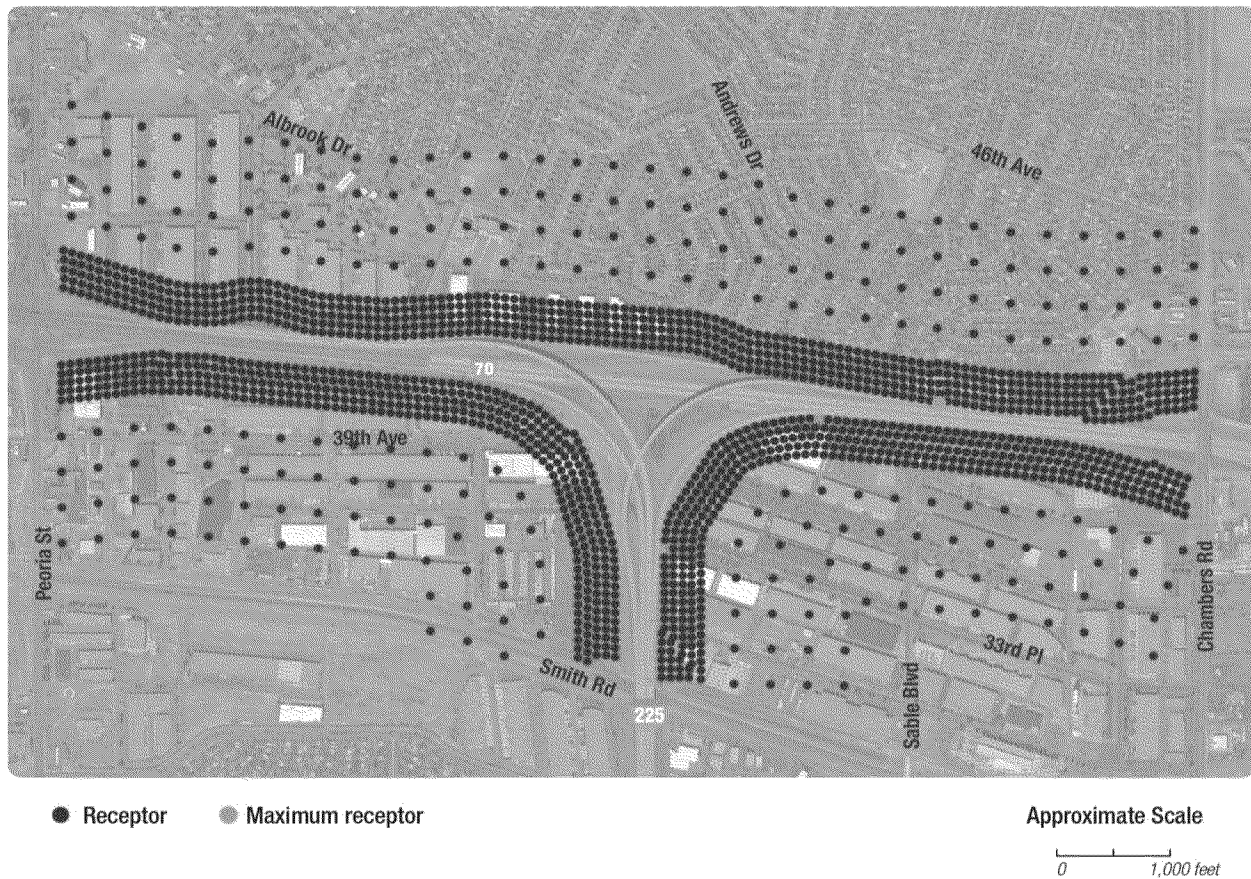
2

3

1 **Figure 4 Maximum Concentration Receptor Locations for PM<sub>10</sub> at Swansea/I-70**



2  
3 **Figure 5 Maximum Concentration Receptor Locations for PM<sub>10</sub> at I-70/I-225**



4

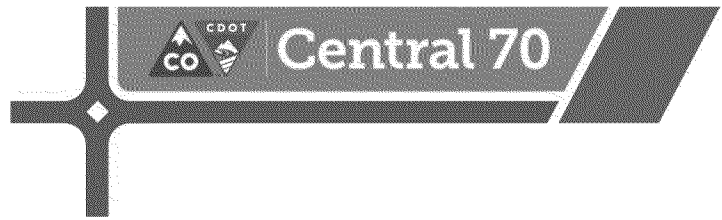
## 8 CONCLUSIONS

As stated above, the project is included in the DRCOG 2016–2021 TIP and the fiscally constrained 2040 RTP, which were found to conform to the carbon monoxide, PM<sub>10</sub>, and ozone SIP. The design and scope of the Central 70 Project are consistent with that used in the regional emissions analysis for the RTP and TIP.

Additionally, based on the carbon monoxide and PM<sub>10</sub> hotspot analyses conducted, the Central 70 Project has been determined to not cause an exceedance of any applicable NAAQS. The carbon monoxide and PM<sub>10</sub> hotspot analyses described above demonstrate that the project will not contribute to any new local violations, increase the frequency or severity of any existing violation, or delay timely attainment of the NAAQS or any required interim emissions reductions or other milestones. This project is consistent with the PM<sub>10</sub> SIP measures. This project complies with the Transportation Conformity Regulations in 40 CFR §93 and with the conformity provisions of Section 176(c) of the Clean Air Act.

## 9 REFERENCES

- Clean Air Act of 1990, Pub. L. No.101-549, 42 United States Code (USC) §7401–7661. (1990).
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- U.S. Environmental Protection Agency. (2015). *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM<sub>2.5</sub> and PM<sub>10</sub> Nonattainment and Maintenance Areas*. EPA-420-B-15-084. Washington, D.C.: U.S. Government Printing Office.



**I-70 East**

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**Air Quality NEPA Comparison  
Technical Report**

**December 2016**



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# TABLE OF CONTENTS

Chapter	Page
1 PURPOSE OF THIS REPORT .....	1
2 INTERAGENCY CONSULTATION.....	1
3 CHANGES SINCE THE FINAL EIS .....	1
3.1 Design Changes .....	2
3.2 Release of the 2040 Focus travel demand model by DRCOG and update of year of peak emissions.....	2
3.3 Change in the PM <sub>10</sub> Study Area .....	3
4 NEPA COMPARATIVE ANALYSIS .....	3
4.1 Carbon Monoxide Analysis Methodology .....	3
4.2 PM <sub>10</sub> Analysis Methodology .....	5
4.3 Modeled Results.....	7
5 CONCLUSIONS .....	12
6 REFERENCES .....	13

## Figures

Figure 1	Locations for Comparative Air Quality Analysis.....	6
Figure 2	Maximum Concentration Receptor Location for Carbon Monoxide .....	8
Figure 3	Maximum Concentration Receptor Locations for PM <sub>10</sub> at I-70/I-25.....	10
Figure 4	Maximum Concentration Receptor Locations for PM <sub>10</sub> at I-70/I-225 .....	11

## Tables

Table 1	Carbon Monoxide Comparative Analysis Maximum Concentrations.....	8
Table 2	PM <sub>10</sub> Comparative Analysis Maximum Concentrations .....	9

## LIST OF ACRONYMS

AM	Morning
APCD	Air Pollution Control Division
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Health and Environment
CFR	Code of Federal Regulations
DRCOG	Denver Regional Council of Governments
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FHWA	Federal Highway Administration
GHG	Greenhouse gas
I-25	Interstate 25
I-70	Interstate 70
I-225	Interstate 225
I-270	Interstate 270
LOS	Level of service
MOVES2010b	Motor Vehicle Emission Simulator version 2010b
MSAT	Mobile source air toxic
NAAQS	National ambient air quality standards
NEPA	National Environmental Policy Act
PM	Afternoon
PM10	Particulate matter of 10 microns or less in diameter
ppm	Parts per million
ROD	Record of Decision
RTP	Regional Transportation Plan
SIP	State Implementation Plan
TIP	Transportation Improvement Program
VMT	Vehicle miles traveled
$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter



## 1 PURPOSE OF THIS REPORT

This document has been prepared to provide updates to the analyses that predict potential impacts to air quality in the designated air quality study area for the Interstate 70 (I-70) East Project as defined in the Final Environmental Impact Statement (Final EIS). Updates included in this report are for the air quality analyses considered for National Environmental Policy Act (NEPA) purposes and to compare the reasonable alternatives discussed in the Final EIS. A separate document has been prepared to detail the draft transportation conformity analysis and the conformity determination for the project.

As outlined in the Final EIS, it is the intent of the Federal Highway Administration (FHWA) and the Colorado Department of Transportation (CDOT) to implement the Preferred Alternative of the I-70 East Project in its entirety. However, due to current funding limitations, there is only enough money to implement Phase 1 of the Preferred Alternative, which is herein referred to as the Central 70 Project. The Record of Decision (ROD) for the Central 70 Project allows it to move forward into construction. The Central 70 Project incorporates portions of the identified Preferred Alternative, the Partial Cover Lowered Alternative with Managed Lanes Option. It includes all construction and mitigation commitments included in the Preferred Alternative from Brighton Boulevard to Chambers Road. It also includes several minor design changes that occurred in consideration of comments received on the FEIS.

## 2 INTERAGENCY CONSULTATION

The approach to the air quality analysis has been documented throughout the project in the Air Quality Analysis Protocol and its updates. The procedures in this document have been reviewed through the Interagency Consultation process for each step in the NEPA process. The agencies involved in the consultation include the U.S. Environmental Protection Agency (EPA), Colorado Department of Public Health and Environment, Air Pollution Control Division (CDPHE-APCD), CDOT, and FHWA. The Interagency Consultation process continued to support the air quality analysis through the review of the updated carbon monoxide and particulate matter less than 10 microns in diameter (PM<sub>10</sub>) modeling completed for the ROD.

## 3 CHANGES SINCE THE FINAL EIS

Changes or updates to the air quality analysis are documented within the following topical categories:

- ☐ Minor adjustments and refinements to the design of the Preferred Alternative resulting from public and agency comments on the Final EIS and continued evaluation of the Build Alternatives
- ☐ Release of the 2040 Focus travel demand model by the Denver Regional Council of Governments (DRCOG) and subsequent update of the RTP planning horizon year and year of peak emissions from 2035 to 2040
- ☐ A change to locations modeled in the PM<sub>10</sub> analysis, focusing on maximum receptor areas for PM<sub>10</sub>, as identified in the Final EIS

Through Interagency Consultation, it was confirmed that some of the content of the Final EIS need not be revised based on the updates noted above. Items not updated in this document include the emissions inventory of health-based National Ambient Air Quality Standards (NAAQS), mobile source air toxics (MSATs), and greenhouse gases (GHGs). In the Final EIS, the project examined regional emissions of these pollutants on a broad scale and followed FHWA guidance in *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA (December 6, 2012)*.

The Final EIS included an emissions inventory of atmospheric carbon dioxide for all alternatives discussed. Though there is new GHG guidance, Interagency Consultation with FHWA, EPA, and APCD confirmed that it is not necessary to repeat this analysis because of the following reasons:

- ☐ Changes to the project design are minimal, so changes to results of analysis at the air quality study area level—which includes the entire project, as well as the surrounding local road network—would not be noticeable
- ☐ The regional air quality inventory analysis is primarily a trend-line comparison between project alternatives. The Final EIS adequately discusses these trends for the use of a NEPA comparison and updates to the analysis for the ROD would not alter previously shown regional air quality trends
- ☐ The new GHG guidance states that projects that have published a Final EIS are not required to update their analysis

### **3.1 Design Changes**

There have been minor adjustments and refinements to the design of the Preferred Alternative. The changes to the design resulted from public and agency comments on the Final EIS and continued evaluation of the Build Alternatives. These design refinements include, but are not limited to, revising some intersection configurations, installing ramp meters at entrance ramps, adding turn lanes on frontage roads and other surface streets, and revising on- and off-ramps and managed lane ingress/egress locations. These design refinements do not change the overall result of the analysis performed for any of the alternatives.

Because the design modification will cause a change, albeit a minor one, to traffic patterns in the project area and within the comparative areas, traffic analysis was updated and air quality analysis was replicated using new traffic inputs to validate the comparison of reasonable alternatives in the Final EIS. The decision to update air quality results in this manner was confirmed through the Interagency Consultation process.

### **3.2 Release of the 2040 Focus travel demand model by DRCOG and update of year of peak emissions**

Since the Final EIS, DRCOG released its updated 2040 Regional Transportation Plan (RTP), which utilizes the Focus travel demand model. Although the trip-based Compass travel demand model used for the Final EIS continues to be an approved resource for quantifying traffic in the region, CDOT decided in consultation with the interagency partners to revise the traffic volumes used for the NEPA comparative analysis should be developed from the Focus travel demand model.

As of March 16, 2016, the Central 70 Project has been incorporated into the 2015 Cycle 2 Amendments to the 2040 Fiscally Constrained RTP. The carbon monoxide and PM<sub>10</sub> analyses have been updated since the Final EIS reflecting the 2040 timeframe of DRCOG 2040 RTP. Additionally, 2040 has been identified as the

year of peak emissions based on regional transportation and air quality analysis that show 2040 to be the year of the highest traffic volume and highest regional emissions of PM<sub>10</sub> and carbon monoxide (DRCOG, 2016a; DRCOG, 2015a).

### **3.3 Change in the PM<sub>10</sub> Study Area**

The air quality comparative analysis was conducted at locations that are expected to have the highest concentrations of PM<sub>10</sub> across the study area. Changes to the study area are described in Section 4.2.

## **4 NEPA COMPARATIVE ANALYSIS**

This section discusses the updates to the results of the air quality comparative analysis and the effects of the alternatives on carbon monoxide and PM<sub>10</sub> emissions. This analysis is not meant to meet the requirements for the project-level conformity determination for I-70 East, but as an update to the comparison of effects between the alternatives discussed in the Final EIS for NEPA purposes.

### **4.1 Carbon Monoxide Analysis Methodology**

As described in Section 3 above, design changes made since the release of the Final EIS resulted in minor modifications to traffic patterns. To reflect these changes, all of the alternatives were updated using the 2040 travel demand model with links revised to reflect the design changes. The new traffic data were used to update the carbon monoxide comparative models, as agreed to through Interagency Consultation.

During Interagency Consultation, the EPA Administrator for Region 8 approved a process decision to streamline the comparative intersection analysis of numerous years by creating a worst-case scenario using the worst-case emissions factors combined with the worst traffic volume. As agreed to by the EPA Administrator and reported in the Final EIS, the carbon monoxide analysis for the I-70 East Project used the highest vehicle miles traveled (VMT) activity in the year 2035, combined with the Motor Vehicle Emissions Simulator (MOVES) emissions factors in the opening year 2010 (EPA, 2013).

For the update of the carbon monoxide NEPA comparative analysis, the methodology remained primarily the same as the Final EIS. The highest emission factors (2022) were combined with the highest traffic volumes (2040). Because the improvements will not be built for several more years, 2022 was judged to be more representative of opening-day conditions than 2010. This method overstates carbon monoxide concentrations, but ensures the maximum potential carbon monoxide concentrations are considered. Other modeling parameters, such as meteorology, were consistent with those used during Final EIS carbon monoxide hotspot analysis.

#### **Model selection**

An emissions model and an air quality dispersion model were selected through the Interagency Consultation process. The analysis for the ROD used the same models as with the Final EIS, and continued to use EPA's MOVES2010b model at the project level to estimate emissions for each roadway link in the carbon monoxide study area. The update to the analysis started in May 2016 during the MOVES2014 grace period

As with the Final EIS, EPA's CAL3QHC software was used to conduct carbon monoxide dispersion modeling.

## **Model year**

The worst traffic year was updated following the Final EIS, from 2035 to 2040. As discussed above, this update is consistent with regional air quality modeling and with the choice to represent the worst-case scenario. CDOT agreed with APCD's request to use 2022 for the updated modeling to represent the project opening year. The project analysis is required to account for the year of peak emissions within the time frame of the long range plan, and 2010 is not within that timeframe.

## **Locations to model**

As with the Final EIS, the Colorado Boulevard interchange was identified as the location to represent the worst traffic conditions on the corridor. For the Final EIS, a sensitivity analysis was performed using the DynusT traffic model to validate the choice of the I-70 interchange at Colorado Boulevard as the worst-case location for the carbon monoxide NEPA comparative analysis. The analysis found that the I-70 interchanges at Quebec Street and Colorado Boulevard are the two worst interchanges in 2035, with the model predicting slightly higher carbon monoxide emissions at the Quebec Street interchange due to higher traffic volumes and longer delays.

While updating the traffic data to the most recent 2040 Focus model released since publication of the Final EIS, the traffic volumes at Colorado Boulevard and Quebec Street were reviewed again. The predicted 2040 traffic Level of Service (LOS) at Colorado Boulevard in the morning (AM) and afternoon (PM) peak hours is LOS D. The same relatively small differences in traffic and congestion between the two intersections exist in the new 2040 model as was reported in the Final EIS. The predicted results from modeling carbon monoxide emissions would vary only by 0.2 parts per million (ppm) to 0.4 ppm, as disclosed in the Final EIS Air Quality Technical Report. Given the minimal differences, continued use of the I-70 and Colorado Boulevard interchange as the location for the carbon monoxide analysis is appropriate.

## **Emission factors**

Carbon monoxide emission factors were developed using MOVES2010b for 2040. Carbon monoxide emission factors were developed for various vehicle types, road slopes, road types, and vehicle speeds. From these data, composite carbon monoxide emission factors were developed for each road segment by referencing emission factors for DRCOG traffic links, depending on the traffic and geographic characteristics of those links.

## **Background concentrations**

To estimate maximum carbon monoxide concentrations, modeled results were added to background values provided by APCD. Values for background concentrations in the year 2040 related to measured concentrations in the NAAQS are as follows:

- One-hour background concentration = 5.5 ppm

- Eight-hour background concentration = 3.6 ppm

These values show a 14-percent reduction from the one-hour background concentration estimates used in the Final EIS and a 21-percent reduction for eight-hour background concentrations.

## Alternatives analyzed

As discussed previously, the primary purpose of the comparative analysis is to update results documented in the Final EIS based on minor design changes and traffic forecasts for the year 2040. As agreed to by the EPA Region 8 Administrator and reported in the Final EIS, the carbon monoxide analysis for the I-70 East Project used the highest vehicle miles traveled (VMT) activity in 2040 combined with the MOVES emissions factors in the opening year. This method produces artificial modeling conditions that overstate carbon monoxide concentrations, but ensures the maximum potential carbon monoxide concentrations are considered.

## 4.2 PM<sub>10</sub> Analysis Methodology

As described above, design changes made since the release of the Final EIS resulted in minor modifications to traffic patterns. The new traffic data were used to update the PM<sub>10</sub> comparative models for each reasonable alternative in the Final EIS, as agreed to by Interagency Consultation.

Methodology for conducting the PM<sub>10</sub> comparative analysis, as well as for calculating a design value, are consistent with processes documented in the Final EIS. EPA's guidance (EPA-420-B-13-053) for calculating design values was applied to the PM<sub>10</sub> comparative analysis; and the design values estimated through the comparative analysis were assessed for each alternative and compared against the NAAQS for PM<sub>10</sub>.

## Model selection

Continued from the Final EIS, EPA's MOVES2010b model was used at the project scale to estimate emissions for each roadway link. EPA's AERMOD model (version 15181) was selected through Interagency Consultation for the air dispersion analysis and estimation of pollutant concentrations at receptors in the local near-road land areas. AERMOD can model lowered sections of roadway, as in the Partial Cover Lowered Alternative, as well as the outflow from the proposed covered portion of I-70.

## Model year

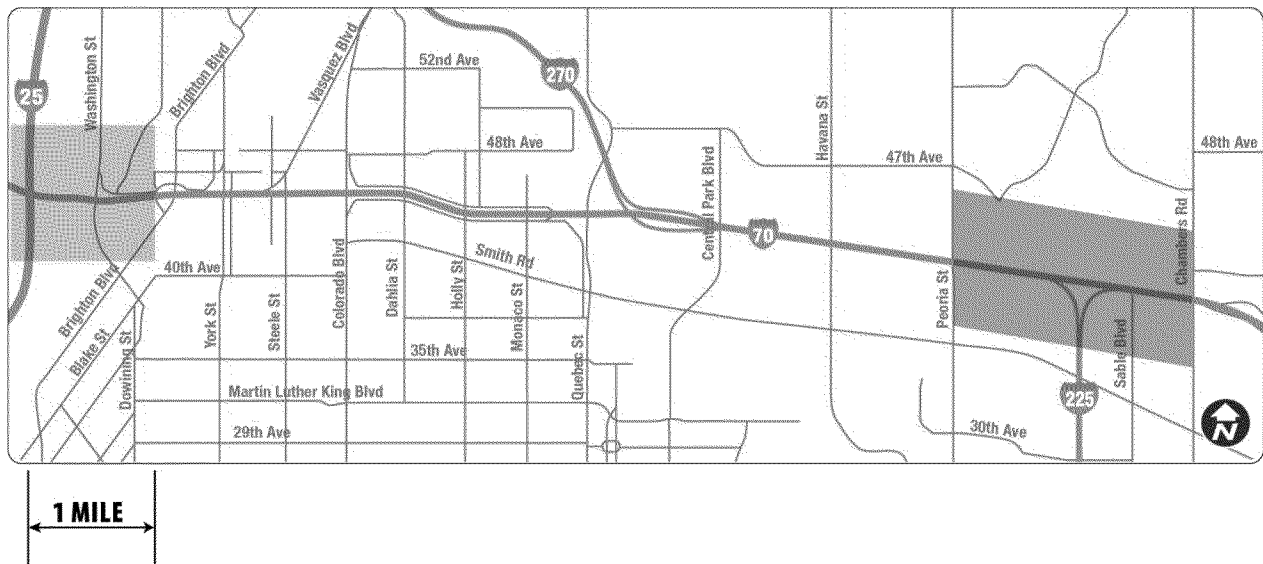
As discussed previously, for consistency with regional air quality modeling and based on assumptions developed from regional PM<sub>10</sub> modeling results, 2040 has been identified as the year of peak emissions, and is, therefore, the most indicative of the worst air quality conditions for a comparative analysis.

## Locations to model

The air quality comparative analysis was conducted at locations that are expected to have the highest concentrations of PM<sub>10</sub> across the study area. Considerations for locations with the highest concentrations include areas with the highest traffic volumes and congestion, nearby land uses with public access, high numbers of diesel vehicles, and other factors.

Based on the locations of maximum receptors and results presented in the Final EIS, the interchange of I-70 and I-25 and the interchange of I-70 and Interstate 225 (I-225) have been maintained as the primary focus areas for the NEPA comparative analysis (see Figure 1). Previous modeling indicated that the highest concentrations were predicted along the I-25 corridor and along I-70 at the I-225 interchange.

## 1 **Figure 1 Locations for Comparative Air Quality Analysis**



For the project analysis, traffic links were included in the air quality model if there was a design or operational change to the roadway network or if the project had a negative impact on roadway operations. This included local roads and intersection operations where there are designs that add capacity.

### **Emission factors**

Emission factors for PM<sub>10</sub> were developed using MOVES2010b. PM<sub>10</sub> emission factors were developed for various vehicle types, road slopes, road types, and vehicle speeds. From these data, composite particulate emission factors were developed for each road segment by referencing emission factors for DRCOG traffic links, depending on the traffic and geographic characteristics of those links.

Road dust from mobile sources is the major contributor of particulate emissions from the project. MOVES does not calculate particulate matter emissions from road dust. To estimate road dust and sanding emissions for this analysis, emissions factors from the most recent PM<sub>10</sub> conformity modeling were used, accounting for dust mitigation controls committed to by CDOT in consultation with APCD.

### **Background concentrations**

Updated EPA guidance (email on June 20, 2016, from EPA Region 8, included in correspondence with EPA, Appendix J) requires use of the third highest PM<sub>10</sub> value over a three-year period, excluding exceptional events, to represent background concentrations. For the NEPA comparative analysis, the background concentrations were estimated using 2012 to 2014 data, resulting in a background PM<sub>10</sub> value of 113 micrograms per cubic meter (µg/m<sup>3</sup>).

## Alternatives analyzed

As discussed previously, the primary purpose of the comparative analysis is to update results documented in the Final EIS based on minor design changes and traffic forecasts for the year 2040. To accomplish this, the following alternatives were analyzed:

- ☐ No-Action Alternative
- ☐ Revised Viaduct Alternative, General-Purpose Lanes
- ☐ Revised Viaduct Alternative, Managed Lanes
- ☐ Partial Cover Lowered Alternative, General-Purpose Lanes
- ☐ Partial Cover Lowered Alternative, Managed Lanes (Preferred Alternative)
- ☐ Central 70 (Phase 1)

## Receptor grid

The methodology to determine the receptor placement remained the same for the air quality update as described in the Final EIS. However, the design changes described above required minor changes to the location of the receptors in the comparative model. The project limits are different with the design modifications, and because the receptor grid is required to be a certain distance from the roadway, the placement of receptors changed.

## 4.3 Modeled Results

### 4.3.1 Carbon Monoxide

Table 1 and Figure 2 show the modeled 1-hour and 8-hour carbon monoxide concentrations from CAL3QHC and the resulting total carbon monoxide concentrations for the Preferred Alternative and Central 70 Project for the AM and PM peak periods at I-70 and Colorado Boulevard. Concentrations in the table are shown for the receptors with the highest levels inside the study area for the carbon monoxide analysis. As the numbers indicate, the 8-hour design values resulting from the AM and PM analysis are both well below the 8-hour NAAQS limit of 9.0 ppm. Since the carbon monoxide comparative analysis is a worst-case scenario, it is reasonable to conclude that the carbon monoxide concentrations at any intersection affected by the Preferred Alternative also would be well below the NAAQS limit.

1 **Table 1 Carbon Monoxide Comparative Analysis Maximum Concentrations**

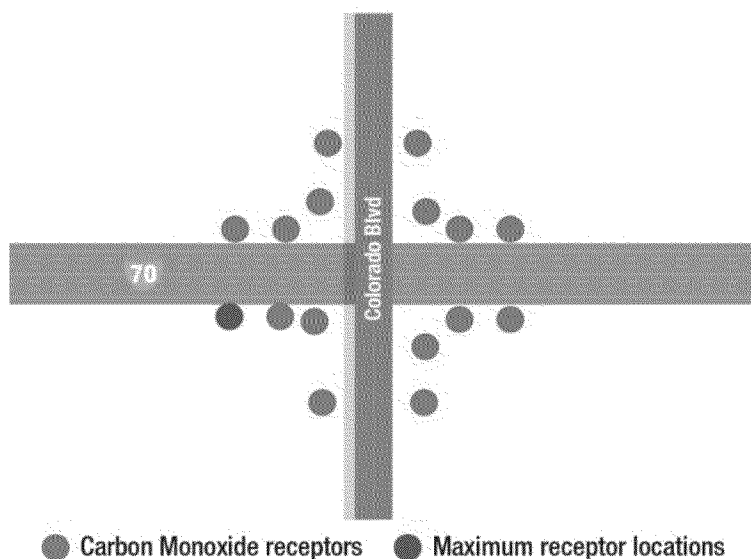
Analysis Time Period	Time of Day	Carbon Monoxide Concentration in parts per million (ppm)		
		Background*	Modeled	Total Background + Modeled
Preferred Alternative (Partial Cover Lowered Alternative with Managed Lanes)				
1-hour	AM	5.5	1.4	6.9
	PM		1.9	7.4
8-hour	AM	3.6	0.9	4.5
	PM		1.3	4.9
Central 70 Project (Phase 1 of the Preferred Alternative)				
1-hour	AM	5.5	1.4	6.9
	PM		1.9	7.4
8-hour	AM	3.6	0.9	4.5
	PM		1.2	4.8

2 \*Background concentrations provided by APCD.

3 **Maximum receptor locations**

4 The receptor with the maximum carbon monoxide concentrations is shown in Figure 2. The maximum  
 5 receptor for both the AM and PM periods is located in the southwestern quadrant of the Colorado  
 6 Boulevard interchange. This location differs from results presented in the Final EIS, which showed the  
 7 maximum receptor in the northwestern quadrant in the AM period. Modeled concentrations make up such  
 8 a small percentage of the total carbon monoxide concentrations that small variations in traffic input are  
 9 exaggerated in the comparisons between modeling estimations for each receptor. This exaggeration would  
 10 explain differences between the Final EIS and ROD modeling results.

11 **Figure 2 Maximum Concentration Receptor Location for Carbon Monoxide**



12



### 4.3.2 PM<sub>10</sub>

Table 2 contains the comparative analysis results for the I-70/I-225 and I-70/I-25 locations, for the alternatives evaluated in the Final EIS. The modeled project emissions concentrations include exhaust, brake wear, and tire wear emissions from on-road vehicles and re-entrained road dust kicked up into the air by passing vehicles. Design values for PM<sub>10</sub> are reported using EPA's guidance (EPA-420-B-15-084). To develop these estimates, the 24-hour PM<sub>10</sub> design value is rounded per guidance to the nearest 10 µg/m<sup>3</sup>. For example, 155.000 rounds to 160, and 154.999 rounds to 150.

**Table 2 PM<sub>10</sub> Comparative Analysis Maximum Concentrations**

Alternative/Location	PM <sub>10</sub> Concentration in micrograms per cubic meter (µg/m³)			
	Background	Modeled	Total Background + Modeled	Design Value
No-Action Alternative				
I-70 and I-25	113	40.396	153.396	150
I-70 and I-225		28.732	141.732	140
Preferred Alternative (Partial Cover Lowered Alternative with Managed Lanes)				
I-70 and I-25	113	41.196	154.196	150
I-70 and I-225		32.285	145.285	150
Central 70 Project (Phase 1 of the Preferred Alternative)				
I-70 and I-25	113	41.136	154.136	150
I-70 and I-225		32.220	145.220	150
Revised Viaduct Alternative, General-Purpose Lanes				
I-70 and I-25	113	41.554	154.554	150
I-70 and I-225		30.564	143.564	140
Revised Viaduct Alternative, Managed Lanes				
I-70 and I-25	113	41.073	154.073	150
I-70 and I-225		32.968	144.968	140
Partial Cover Lowered Alternative, General-Purpose Lanes				
I-70 and I-25	113	41.703	154.703	150
I-70 and I-225		31.085	144.085	140

### Maximum receptor locations

Similarly to the Final EIS, PM<sub>10</sub> concentration levels vary throughout the I-25 and I-225 PM<sub>10</sub> comparative analysis areas depending on the alternative modeled. Figure 3 and Figure 4 show receptor locations and maximum receptor values for the I-70/I-25 and I-70/I-225 PM<sub>10</sub> comparative areas for all alternatives analyzed. As shown, the maximum receptor for all alternatives is located in the southeast quadrant of the I-25/I-70 interchange.

1 **Figure 3 Maximum Concentration Receptor Locations for PM<sub>10</sub> at I-70/I-25**



● Receptor

● Maximum receptor all alternatives

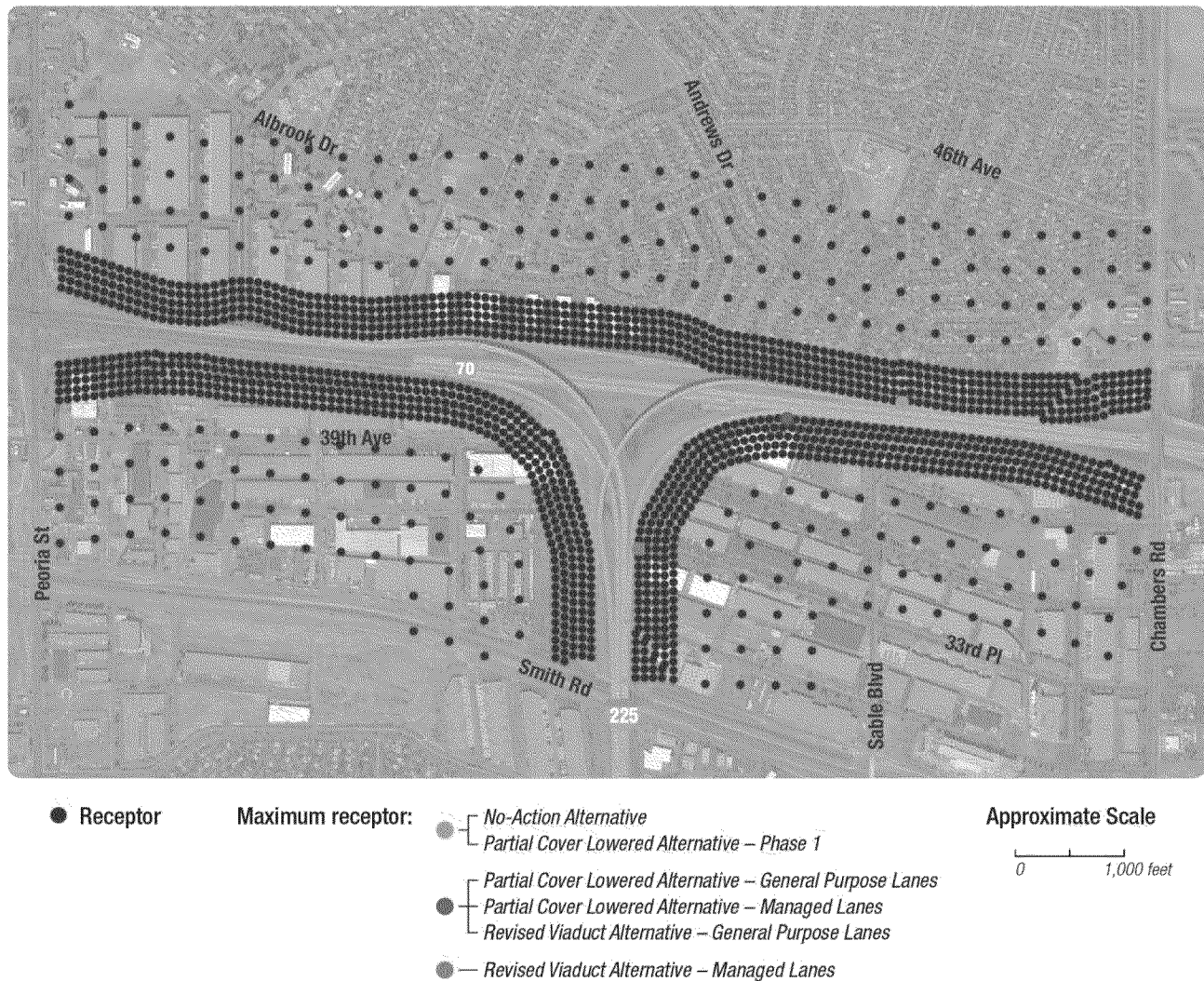
Approximate Scale

0 1,000 feet

2

3

1 **Figure 4 Maximum Concentration Receptor Locations for PM<sub>10</sub> at I-70/I-225**



2  
3 Based on the values reported in Table 2, the results of the PM<sub>10</sub> comparative analysis demonstrate that all  
4 of the alternatives are within a 7-percent difference and many values are estimated to have the same  
5 design value. The No Action and Revised Viaduct Alternatives are estimated to have a design value of 140  
6  $\mu\text{g}/\text{m}^3$  while the other alternatives, including the Preferred Alternative and the Central I70 Project, have a  
7 design value of 150  $\mu\text{g}/\text{m}^3$ . It should be noted that all alternatives including the Preferred Alternative, will  
8 be in compliance with the applicable 24-hour NAAQS standard for PM<sub>10</sub> (150  $\mu\text{g}/\text{m}^3$ ).

9 As with results presented in the Final EIS, the design values presented in Table 2 simulate worst-case  
10 conditions because they represent the highest PM<sub>10</sub> concentrations at the highest traffic volume locations  
11 in the corridor. Therefore, it can be assumed that the PM<sub>10</sub> concentrations would be lower than these  
12 values at every possible receptor location throughout the corridor, including all schools, parks, open  
13 spaces, and other places.

## 5 CONCLUSIONS

As stated previously, carbon monoxide concentrations for the Preferred Alternative and Central 70 Project for the AM and PM peak periods at I-70 and Colorado Boulevard are both well below the 8-hour NAAQS limit of 9.0 parts per million (ppm). Since the carbon monoxide comparative analysis is a worst-case scenario, it is reasonable to conclude that the carbon monoxide concentrations at any intersection affected by the Preferred Alternative also would be well below the NAAQS limit.

The results of the PM<sub>10</sub> comparative analysis demonstrate that all of the alternatives are within a 7-percent difference and many values are estimated to have the same design value. All alternatives including the Preferred Alternative, will be in compliance with the applicable 24-hour NAAQS standard for PM<sub>10</sub> (150 µg/m<sup>3</sup>).

## 6 REFERENCES

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